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Allocation of Resources to Research and Development

Volume IV of IV

The Problem of Comparisons and Forecasts of Soviet Ground Weapons Technology and RDT&E for Net Assessments and US Army R&D Planning—A Preliminary View

by William J. Spahr
John P. Hardt
Susan E. McGuire

Soviet Communist Area Studies

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John P. Hardt
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This volume ~~of the report~~ provides a preliminary view on the methods by which foreign intelligence, particularly Soviet, might be integrated into the R&D planning and decision-making process. It examines the need for, and suggests the content of, net assessments of current US and Soviet technology, considers the problem of utilizing foreign intelligence in long-range estimates, and suggests a method of integrating available intelligence into the planning and concept formulation process. Since R&D decisions are not made in an economic/political/doctrinal vacuum, this paper outlines factors in these areas which should also be considered in order to understand the context of the Soviet decision-making process.

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McLean, Virginia 22101

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FOREWORD

This is one of four volumes which, collectively, comprise the final report of RAC Project 010.125, "US Army Research and Development Resources Allocation." The project addresses some key management issues for research and development in an era of declining military budgets. The project was sponsored by the Office of the Chief of Research and Development (OCRD) and was initiated in May 1970. It grew out of an earlier exploratory study initiated as a RAC Institutional Research Project on the basis of discussions with the Deputy Chief of R&D, US Army, and his staff.

The four volumes of this report cover the following subjects:

Volume 1 describes alternative strategies for the allocation of RDTE resources which offer the decision maker a range of choices in terms of costs, benefits, and consequences;

and

describes a model for iterative use by the R&D manager to examine a variety of funding constraints and allocation strategies.

Volume 2 develops alternative approaches to a new series of papers called "Army Systems Coordinating Documents (ASCODs)" aimed toward achieving a better correlation of research and development systems planning with future materiel requirements.

Volume 3 identifies the need for and content of technological forecasting and develops methods for its integration into the planning and concept formulation process.

Volume 4 identifies the need for and content of threat forecasting as it relates to net assessment for each ASCOD area and develops methods for its integration into the ground weapon planning and concept formulation process.

In addition to the assistance provided by alternative formats for the ASCODs and the suggestions for improving the utility of technological and threat forecasts, the project has made an original and practical contribution to the modeling of the R&D resource allocation process. This management tool promises, through an efficient and simple procedure, to assist both the R&D decision maker and the R&D programmer in the making of the many small changes to the RDTE funding schedule that are required in the operation of the budget cycle.

CLIVE G. WHITTENBURY
Vice President
Technological Systems

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CONTENTS

SUMMARY

PROBLEM

To identify the need for and content of net assessment for each Army System Coordinating Document (ASCOD) area and the need for and content of threat forecasting, and to develop methods for their integration into the planning and concept formulation process.

FACTS

A survey of available intelligence products concerned with Soviet technology indicated that there are considerable data available on Soviet weapons and equipment which are formated in various ways. Existing comparative studies were developed to present available data but they uniformly stop short of providing net assessments. Already implicit in the RDT&E funding process are judgments on current and projective assessments of enemy capability as they impact on the utility of our capability over time. Items of obvious current interest appear to be brought to the attention of OCRD on an ad hoc basis but no systematic approach to the entire spectrum of weapons systems could be ascertained. Those intelligence personnel interviewed were aware of the absence of net assessments in available documents. Examination of various documents concerned with long range threat analysis showed that broad estimates of possible Soviet weapons developments had been made. However, there was little indication of specific OCRD input during preparation of the estimates designed to isolate the areas of critical interest to the R&D planner. There appeared to be only the broadest attempt to identify, analyze and estimate the impact of economic and political trends on future Soviet R&D efforts (see Bibliography).

DISCUSSION

In considering the problem of net assessments of both current and estimated Soviet technology from the point of view of the R&D planner and in examining the available literature, there appeared to be a clear requirement that the data and the estimates be tailored to the needs of the user—in this case, the R&D planner. At each phase of the problem—current net assessments, future net assessments, linear and nonlinear forecasts of technology—potential benefits to the R&D planner is the chief criterion used in the examination. Throughout the examination the difficulties of collecting information on Soviet technological developments were a continuing consideration and this is reflected in the tentative conclusions. Hypothetical examples for illustrative purposes are used particularly to exemplify the types of general questions OCRD might ask in the economic and political area to supplement comparative technological data.

FINDINGS

1. The RDTE funding process embodies an implicit net assessment of enemy capability and its continuing impact on the utility of our capability.

2. The information on comparative Soviet/US technology is not available in the form required by the ASCODs* or as a basis of forecasts in the 14 R&D hardware objective areas.

3. No one agency in the Army appears to have the responsibility at present for developing a systematic net assessment for the Army R&D hardware areas.

4. Comparative Soviet technological data needed for the ASCODs require more than compilation in different form or reformating. Gaps exist that can only be filled by additional intelligence estimates and careful intelligence analysis. Identification of these gaps, in turn, is related to explicit ASCOD requirements.

5. Net assessments of comparative US/Soviet data cannot avoid subjective analysis and judgment. Moreover, to be effective, the judgments should be guided by analysis of the asymmetries deriving from the different strategies, tactics and perceptions of threats. Likewise analyses are required to identify critical indicators of central points of comparison in the net assessments.

*See Volume II.

6. Useful linear projections of technological data—postulating constant policy, strategy, tactics and priorities—require significant in-depth analyses in the 14 R&D hardware areas for initial net assessments in technological forecasts.

7. Dynamic analyses relaxing constancy assumptions for policy, strategies, tactics, and priorities are required for technological forecasts. Case studies on Soviet priorities for Europe, China and the Third World as well as analyses of alternative domestic policies would provide useful inputs to dynamic technological forecasts in 14 R&D hardware areas.

CONCLUSIONS

1. Implicit judgment of current and projective assessments relating to perceived utility of alternative US R&D programs should be made explicit.

2. An across-the-board survey and comparison of Soviet weapons and equipment placed in a broad military-political context should provide the R&D planner new insights into the uses the Soviet Union is making of its technology at present, the trends in the future development of Soviet weaponry, and a reasonable basis for choosing certain weapons systems and equipment for improvement and allocating scarce resources in the RDT&E process. In addition, the survey should provide the R&D planner the rationale with which to defend his choice.

3. Soviet comparative ground weapon technology analyses need to be updated, analyzed, and reformated in order to provide an improved net assessment. Case examples or pilot studies such as the appropriate sections of the tank/antitank ASCOD might serve as useful for the expanded format.

4. Soviet forecasts based on critical current comparisons and net assessments need to be systematically developed. An elaboration of the tank/antitank ASCOD current net assessment might be a point of departure.

5. In any estimate of the relative utility among US Army R&D objectives (the 14 ASCOD categories) the assessment of the Soviet current and projective capability is a major, perhaps, critical, variable. Possibly more than any other single factor a correct estimate of Soviet capabilities will underlie the judgment on relative utility of various alternative US R&D programs. Thus the correct judgment on utility in the RDT&E process may be highly sensitive to the net assessment.

ALLOCATION OF RESOURCES TO RESEARCH AND DEVELOPMENT

Volume IV of IV
The Problem of Comparisons and Forecasts
of Soviet Ground Weapons Technology
and RDT&E for Net Assessments
and US Army R&D Planning—A Preliminary View

Chapter 1

INTRODUCTION

This volume of the report provides a preliminary view on the methods by which foreign intelligence, particularly Soviet, might be integrated into the R&D planning and decision-making process. It examines the need for, and suggests the content of, net assessments of current US and Soviet technology, considers the problem of utilizing foreign intelligence in long range estimates, and suggests a method of integrating available intelligence into the planning and concept formulation process. Since R&D decisions are not made in an economic/political/doctrinal vacuum, this paper outlines factors in these areas which should also be considered in order to understand the context of the Soviet decision-making process.

Soviet weaponry does not represent the totality of weaponry comprising the threat to the US and its allies, but Soviet R&D is far and away the most important in the areas of direct interest to the US Army. It should be recalled that the Communist Chinese still use models of Soviet equipment and the Soviet Union is the weapons supplier for not only the Communist world but to many non-Communist nations.

The utility of R&D, as noted by Dr. Tiede and Dr. Newman in Vol 1, is implicit in the judgments made in producing RDT&E funding schedules.* An aspect of the degradation of the R&D utility assessment is the comparison of current and projective US and Soviet capabilities—the net assessment. How important this introduction of the threat is to the US Army's judgment on ground weaponry and how important R&D in ground weaponry is to our national interest are points of current discussion.

*See Volume 1, p. 6-1.

Soviet military technology has come in for considerable recent attention in the United States, e.g., Secretary Laird and Dr. Foster have called particular attention to the "Soviet technological threat," presumably not only reflecting a diminution of our traditional superiority in many areas of R&D but the enhanced requirement for a technological edge to offset possible American manpower cuts.

The overwhelming US interest in the past has been on the assessment of US/Soviet strategic systems. If some constraints on strategic weapons development derive from the SALT or related negotiations, it is possible that future interest will focus on general purpose forces, particularly ground force weaponry. A better assessment of relative US-USSR capability may not only be of direct interest to the US Army R&D planner but may be a matter of high US national security priority, and as defense expenditures are reduced, military R&D effort takes on increasing importance.

In addition to the foregoing general considerations the following specific questions were asked about each phase: For that portion of the problem which deals with current net assessments a number of tentative questions were asked, including: What is needed by the R&D planner, in what form, to make meaningful and explicit current net assessments? Are there data available in the form that the R&D planner can use? Would the data be more useable if they were presented in a different form or reformated? What gaps in the required data would be revealed? Would such as assessment disclose existing Soviet advantages in hardware that should be addressed without delay?

Beyond the current comparative technological analysis a series of questions arises on forecasting Soviet technological developments. Assuming a linear approach, i.e., a set of forecasts based on continuing the policies and resource commitments of the recent past, are the data formulated in US forecasts of Soviet developments in a manner useful for mid-term—5 year and long term—15 year forecasts? What degree of specificity can be applied to long term forecasts of Soviet technological development? Are the identifiable gaps the same as the current assessment? Can they be satisfactorily filled?

By assuming a linear projection one raises implicitly the question, is this assumption valid for the next 5 - 15 years (i.e., the minimum

period for which the utility may be degraded by the Soviet threat). This, in turn, raises the general question, how do the Soviets set the major parameters of their R&D program for conventional ground weaponry? Do they primarily respond to US developments, as may be the case in strategic weaponry, or are their perceived continental, European requirements the primary determinants? If the latter, how do responses to US and other developments and policy changes affect the priorities in their overall plan? What impact do events in Vietnam and the Middle East, for example, have on R&D decisions?

The views presented here must be considered preliminary because no effort was made to apply this proposed method rigorously to any of the R&D hardware areas. Those comments in the paper which refer to the Tank/Antitank area are hypothetical and were used for illustrative purposes only.

The procedures suggested in this volume would be complementary to those suggested in Volume 1 and would ensure a systematic consideration of factors affecting oviet R&D and weapons development when alternate strategies are considered and evaluated. Data provided in comparative technology studies similar to those provided in the proposed Army System Coordinating Documents (ASCODs) discussed in Volume 2 would be utilized in developing the net assessments. It should, however, be noted again that the net assessment judgment is implicit in any R&D planning system whether or not the ASCOD procedure is employed. Integration of technological forecasting into the Army R&D planning is discussed in Volume 3.

Combined expertise on Soviet military, political and economic affairs has been brought to bear to relate the available or potentially available data on Soviet ground weapon technology to the needs of an Army system of R&D planning and forecasting. The approach employed was a series of interviews, evaluation of relevant intelligence documents (see Selective Bibliography), selected analyses, utilization of field experience, and professional appraisals of R&D planning needs. This preliminary effort has suggested some specific questions, i.e., essential elements of analysis, and tentative recommendations as to the agencies to whom the questions might be addressed by OCRD. There

is no attempt nor need to be critical of any agencies involved. The requirements implied by the R&D planning system proposed in these volumes have, in many cases, not been levied. Also, as will be noted, the requirements run well beyond any reasonable capability from normal collection of hard intelligence. Yet the judgments requiring net assessments are being made and may be improved. On this point the following pages will throw some light.

Chapter 2

CURRENT NET ASSESSMENT

GENERAL

Among the various factors the R&D planner must consider prior to making decisions to allocate resources for weapons system and equipment development, the available weapons and weapons development plans of potential opponents must obviously receive priority examination. Ideally, the R&D planner would have at his disposal not only data and characteristics of current weapons and equipment in the hands of potential enemies but also intelligence on enemy plans for future R&D. In addition the R&D planner would be aware of the doctrinal context in which these weapons and equipment were intended to be used and the economic and political factors which support their production, distribution, deployment and possible use. Again, in the ideal case, this information would be provided to the planner in a manner which he could use, which answered the questions he considered significant in the R&D context, and would provide him the basis of confidence that no area of importance to him would be overlooked. Utilizing this information, even more ideally, the R&D planner would be able to measure the military utility of each program area at least at the margin and be able to adjust or degrade that value by the disutility of the enemy's capability. So Air Mobility and Tank/Antitank programs might, through net assessments, be compared as to potential military utility per dollar of RDT&E funds spent.*

In the real world many of these conditions cannot be fulfilled. The United States' principal potential opponent, either in person or by

*See Volume 1.

proxy, the Soviet Union, has proven to be a difficult intelligence target However, the intelligence community has scored significant successes against this target and there is in existence considerable data which can and do provide the basis for analyses and estimates. Examination of this material indicates, however, that what is available is not in a form which is useful to R&D planners. There appears to have been little R&D input into the process with the result that significant questions of interest to R&D planners are not answered. Although there have been some efforts to provide statistical comparisons of US and Soviet weapons and equipment, explicit net assessments have not been attempted.* In the paragraphs below a possible means of filling this gap is considered.

OCRD DATA BASE

The comparative US/Soviet technological data on current weapons and other systems should be formulated in the 14 R&D hardware groups described as materiel objectives in the forthcoming ASCODs:

Air Mobility
Air Defense--Field Army
Tank/Antitank
Communications
Intel Surveillance Tgt Acquisition
Surface Mobility
Indirect Fire Weapons
Infantry Weapon Systems
Logistic Support
Electronic Warfare
Command and Control
Chemical/Biological
Nuclear
Ballistic

*See Annotated Bibliography from which judgments in this paper are largely made.

NET ASSESSMENT

The comparative appraisal of Soviet/US ground capability can lead to a net assessment only if the comparison is carried beyond the available technological data to judgments clearly identifying to the R&D planner in which respect the Soviet weapon or equipment is considered to have an advantage or disadvantage in comparison with its US counterpart. Assuming that the basic comparative data on each item of equipment similar to those provided in Table 2-1 for the Tank/Antitank hardware group are provided in the ASCOD or some similar format, the basis for the judgments involved in a net assessment would be facilitated. This illustrative example is intended to suggest not only what kind of information is required but also to indicate how from an inherently subjective judgment a final net assessment might be made as objective as possible.

It should also be noted that a net assessment is appropriately an intelligence consumer, i.e., an OCRD function. The producers of data for net assessments are not as well equipped as the R&D planner to determine the requirements of the data and make judgments useful to R&D planning. The kinds of data an R&D planner requires are specifically illustrated in a schematic ASCOD format in Table 2-1 for Soviet and US capabilities. The data would then be considered in answering a series of more general questions to be provided for each weapon system, to include the answer to the question: What role does this system play in the Soviet doctrinal scheme? For those weapons and equipment for which there is not an equivalent on one side or other, the general questions will, in effect, attempt to determine whether such weapons or equipment are necessary to the US and whether or not they should be produced or continue to be produced by the US. For example questions such as the following might be addressed in the Tank/Antitank hardware area:

1. Has the development of the smooth bore 115 mm gun and the addition of both horizontal and vertical stabilization significantly improved the T-62's chances of achieving a first round kill on the M-60 or MBT-70?

2. If the next generation Soviet tank has a gun which develops significantly greater muzzle velocity of say 6000 ft/sec what will its chances be of achieving a first round kill on the M-60 (MBT-70) or whatever?

Table 2-1

TANK/ANTITANK HARDWARE ASCOD

Capabilities	Characteristics
	Tank
Movement	Operating range (fuel capacity and type(s) of fuel)?
	Cross-country speed?
	Obstacle crossing
	Vertical wall?
	Slope climb?
	Trench crossing distance?
	Amphibious?
	Snorkel capability?
	Night-driving capabilities?
	Air transportable?
	Droppable?
Fighting	First round kill probability
	Main armament
	Caliber?
	Types of ammunition
	Muzzle velocity?
	Armor penetration capabilities at selected ranges?
	Other penetration capabilities such as concrete at selected ranges?
	Number of rounds carried?
	Second armament
	Caliber?
	Types of ammunition?
	Stabilization type and effectiveness?
	Range-finder type effectiveness?
	Power-driven turret?
	Night-firing capability?

Table 2-1 (Continued)

TANK/ANTITANK HARDWARE ASCOD

Capabilities	Characteristics
	Tank
Passive	Armor arrangement, thickness, type
	Radiation resistance
	Vision-slit protection against nuclear flash
	Smoke-generation capability
	Antiaircraft protection—machinegun/other—if not tank mounted, how provided
	Crew comfort—ventilation
	Communications
	Internal
	External
	Antitank
Movement	Same questions as for tank
	Main armament
	Type
	Guidance
	Armor penetration at selected ranges
	Other penetration capabilities
Fighting	Secondary armament
	Caliber
	Types of ammunition
	Target-acquisition and range-determination method
	Off-vehicle capability?
Passive	Crew protection
	Armor arrangement thickness and type
	Radiation resistance
	Communications
	Internal
	External

3. Does the hemispheric turret provide significant armor protection advantages in relation to its weight?

4. Why are US tanks consistently getting heavier while Soviet tanks are getting lighter?

5. How vulnerable is the Soviet tank to US antitank weapons such as gun fire, recoilless rifles, antitank rockets, land mines, etc.?

6. What tactical roles do the Soviet visualize for the T-62?

The combination of the data plus the answers to the more general questions would provide the basis for the net assessment. In this context the expression "net assessment" would be a specific statement of the advantages and disadvantages of current Soviet hardware in comparison with its US equivalent, both as an individual weapon system or equipment and as it meets its assigned doctrinal role. For example the following might be a net assessment of T-62/M-60 highly simplified for purposes of illustration.

The T-62 is a lighter tank (36 tons) than the M-60 (48 tons). It sacrifices some crew comfort to achieve a lower silhouette but retains essential armor protection. The 115 mm smooth bore gun provides a greater armor penetration capability, an advantage which may be offset to some extent by the power driven turret on the M-60. The manual transmission of the T-62 may be a source of driver fatigue but it, plus the proven suspension system, give the tank a greater mechanical reliability than the M-60. It is probably cheaper to produce, simpler to operate and more reliable in the field than the M-60. On the other hand external fuel tanks appear to make the T-62 more vulnerable than the M-60. The overall assessment is that as a main battle tank designed to be used within the tank division to provide the mobile, armor protected fire power in penetrations and as an infantry support weapon in main theaters of operations by various types of troops, the T-62 is superior to the M-60. Since there is some evidence that a successor to the T-62, which is alleged to feature an improved gun, is already in the prototype stage (referred to as either T-64 or T-66) if not the production stage, the following guidelines for the next family of US tanks suggest themselves.

1. Redesign turret--reduce silhouette--reduce weight
2. Improve gun
3. No change in chassis, power plant, power train

An initial survey of intelligence data indicates that there will be some basic data which is not available and that some of the more general questions will not be answered fully. If this occurs then further collaboration by OCRD with AMC/FSTC and ACSI/ITAD would be required to consider possible revisions in intelligence collection priorities. If it develops that US capabilities for collection against particular items of Soviet ground force equipment are limited, then estimates, clearly labeled, will have to be accepted as a basis for net assessments. Again it should be noted that the answers to these types of questions in a net assessment are implied in any R&D funding decision. Our point is to surface these judgments and provide means for improving them.

On specific Soviet-US weapons systems it is possible, with enough time, resources and priority, to obtain a fairly complete comparative description. In the past, this generalization has been especially valid for strategic systems where sophisticated intelligence systems of collection and high priority in collection and analysis have made comparative evaluations far easier and more accurate than in the case of tactical ground systems.

Difficult as an accurate current assessment is (c.f. the recent AMC-FSTC "red-blue" studies for DDR&E listed first in the bibliography), a meaningful net assessment also requires further analysis of asymmetries in doctrine, tactics, etc. No <u>systematic</u> net assessment for the Army R&D hardware areas exists or could easily be put together. Moreover, in the course of this preliminary survey, no agency in the Army could be identified which is specifically charged with this responsibility. A similar deficiency in the Office of the Secretary of Defense was identified by the Blue Ribbon Defense Panel in its report to the President.* The panel recommended the creation of a Net Assessments Group to advise the Secretary in this area. It would appear that a similar group or system would fill this apparent void in the Army.

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*Report to the President and the Secretary of Defense by the Blue Ribbon Defense Panel, 1 July 1970, US Government Printing Office, pp. 7,31 (The Fitzhugh Report).

Chapter 3

PROJECTIVE NET ASSESSMENT

Utility of Army R&D programs must be adjusted to the threat and other risks over at least a fifteen year period, as noted earlier. Therefore important in current R&D decisions is a projective net assessment.

The long lead times required before weapons systems can go into series production as well as the time involved in the R&D cycle requires estimates of Soviet intentions far into the future. Trends may be interpolated or extrapolated by reference to long range (5-15 year) Army and DIA forecasts in a braoder context, or on assumptions of continuing policy regimen.* These forecasts are based on linear projections which in turn are based on historical precedents, hardware currently available, the state-of-the-art in the technology of a given hardware group, basic research in various technologies known to be in an advanced stage, and a probable need for the weapons system or equipment within the overall ground forces structure forecast.

Soviet tank development, for instance, has utilized a building block technique which has used some proven components in each new model. A linear forecast for the next Soviet production model might predict in part that it would have the same chassis, power plant, power train, etc. as the current tank (the T-62), but would have an improved gun or a non-conventional gun as its main armament. The problem for R&D would be to match or exceed the complete capability of the main armament as a

*Five and fifteen years are conventional in the intelligence forecasts (see Bibliography). "Regimen" as used in this context means holding all variables but technology constant.

system to include its available ammunition, various capabilities, range-finder, and stabilization system. Given the Soviet propensity to use available components, the linear portion of the projection is relatively straight forward; to anticipate the scale and quality of improvement in the new components is much more difficult and, of course, is crucial to the estimate. For example, if the forecasted improvement is in the armament component: Will it be a larger caliber conventional gun or a rocket-assisted, unconventional weapon?

To derive his estimate of the Tank/Antitank ASCOD as the technological possibilities increase, the estimator now employs a combination of linear projections made in the context of existing intelligence on the Soviet R&D effort. Since R&D intelligence, when available, may be ambiguous for the purposes of US R&D planning, that part of the forecast based on linear projection and that based on available intelligence should be separated, clearly identified, and evaluated according to an agreed scale of probability. The estimator should also discuss his reasoning in arriving at his conclusions and indicate possible alternatives if a different mix of linear and non-linear development is used. As an example of the type of forecast which might be useful the following hypothetical case is presented.

Forecast: the next generation of Soviet main battle tank will carry as main armament a 155 mm rocket which will be fired from a tube launcher. The rocket will be capable of guidance from within the turret utilizing an electronic guidance system. The armament will be mounted on the T-62 tank chassis. Basis of forecast: T-62 tank chassis--linear projection, no evidence of new chassis development; main armament-confirmed sightings from R&D tank ranges between 1965-1970. Estimated time to enter into series production 1975--based on previous observations of Soviet production schedules.

The R&D planner considering the characteristics of the next generation US tank would then have a basis on which to set the parameters for the armor protection and main armament of the next generation US tank from this net assessment.

If there is a dearth of information on Soviet R&D activities, this procedure, which would be the best possible under the circumstances,

could leave the R&D planners open to technological surprises. Active participation by OCRD representatives in the projective net assessment process could reduce this possibility, by, as suggested in the current net assessment process, focusing the attention on the intelligence community on the possible technological areas where significant advances are possible. The form of this participation would again be a series of general questions of the "what if?" "why not?" types formulated by OCRD.

In order to improve on the data available for the projected net assessment the same intelligence agencies should be tasked with active OCRD participation. This information while projecting US and Soviet technological data in an ASCOD format, would provide a net future assessment which should also include the rationale behind the estimator's conclusions. Also included might be an evaluation of those parts of the Soviet side of the estimate not based on linear projection or available intelligence, and possible alternative developments.

Chapter 4

MODIFICATION OF LINEAR SOVIET TECH FORECAST

In applying the linear approach we suggest a forecast in which all else is held constant except the change in technology within a specific Soviet counterpart of an ASCOD area. (For example, the new model of Soviet tank using their conventional building block approach is cited above.) We wish however to vary the factors which might at least provide an insight into how they choose among R&D programs regimented by our 14 ASCOD areas. What follows indicates some of these factors. We suggest a tentative priority for Soviet ASCODs from this modified linear approach.

Even with the best current and projected US-Soviet technical development for 5-15 years in the future, it is still necessary to question the projection of the future on the basis of the past—the assumption of linearity. First, it is necessary to address the general rationale of Soviet R&D decisions in the 14 R&D hardware areas of interest to the US Army. Specifically do the Soviets plan, as is sometimes suggested in the strategic weapons area, primarily on the basis of interactions (threat-response) or a perception of a continuous need in Eurasia? Second, in the overall context of policy how does Soviet perception of the Chinese border, Vietnam, and Europe affect priorities in the hardware areas? Finally, what internal changes, e.g., in resource allocation, would have a significant effect on the R&D budget and allocation of any hardware groups? The US R&D planners may find the Soviet projections more problematic after considering these factors. Hopefully the range of possible projections could be better bracketed. This would assist the US R&D planner in making hard choices in an

expected declining budget environment. Moreover it is implicit and necessary in any R&D planning decision to make explicit the effect of a net assessment on the utility of R&D.

SOVIET CONTINENTAL STRATEGY AND ARMS REQUIREMENTS

The political-military situation which faced the Soviet Union in the decade following World War II required that urgent restoration of the internal economy be accomplished, within the political and territorial gains which had been realized as a result of the war. The only threat visible from the West was the brief monopoly of the atomic bomb enjoyed by the United States. During this period the weapon could be delivered only by a heavy bomber and it was this threat which the Soviets reacted to first by constructing the SA-1 ring of antiaircraft defenses around Moscow. There was no valid threat from conventional ground forces which had been rapidly demobilized following the end of the war. In the late 40s as the issues of the conflict between the Soviets and the Western democracies became clearer and sharper and decisions such as the implementation of the Marshall Plan and the creation of NATO were made, the Soviets began to plan extensive modernization of their theater forces. The fruits of this planning and the subsequent research and development became visible to the West in the mid-50s when various new weapons appeared. Significant improvements in conventional weapons such as tanks and artillery had been made increasing the mobility and fire power of the field army. Considerable attention had been devoted to improve the ability of the field army to cross continental water barriers such as rivers, streams, and canals. The equipment which appeared was also designed to defend against the main Western threats which were still aircraft-delivered nuclear weapons.

Intervention forces capable of operating beyond the Eurasian continent were not visible during this period. Parachute troops—a traditional Soviet weapon—continued to be developed as well as specialized air transportable and droppable weapons and equipment—but their operational range was limited by the range of available transport aircraft.

During the decade from 1955 to 1965 the Soviets made great strides in night vision devices, and produced new generations of tanks, artillery weapons, bridging equipment, etc., but the basic thrust of weapons development remained continental. In the late 1960s, the Soviet version of the US Marine Corps began to appear and the AN 22 was produced. The 1967 Moscow Air Show featured parachute troops, helicopter-borne and air transported troops and equipment. Some felt these revelations heralded the desire of the Soviets to develop and maintain forces for use beyond the Eurasian continent. At the same time the shift in Soviet concerns from West to East to the China border carries serious implications for Soviet logistics that the Soviets weigh in terms of Soviet R&D priorities.

In a net assessment the US R&D planner should not conclude or simply assume that Soviet R&D is directed solely or primarily to offset US advantages. Indeed the primary rationale for Soviet requirements seems based more on Eurasian conditions than American countering weapons developments. As a result, projections of Soviet developments based on US plans might lead to major errors in a projective net assessment.

In retrospect, Soviet weapons development appears to have followed a consistent and integrated pattern through the years designed to answer the requirements of overall Soviet doctrine and strategy and, again, has been primarily Eurasian oriented.

Vietnam

Vietnam has provided Soviet R&D planners with considerable benefits both from the point of view of actual hardware which was captured and from opportunity to study US tactics and techniques. Vietnam therefore is a factor influencing the Soviet R&D decisions as a source for an improved Soviet net assessment of our relative capabilities.

The use of electronic sensors, as a means of gathering information on enemy movements in remote areas or in areas to which access is difficult, is undoubtedly of great interest to Soviet planners since they face a comparable problem in surveillance of the China border. They would also seek possible means of defeating or neutralizing these sensors.

The operations of US air-mobile forces are probably under Soviet study with a view to emulation or at least developing defenses against such forces. Feasibility studies on emulation would have to consider what new equipment would have to be developed if it were decided to embrace the air-mobile idea. The equipment might include new helicopters, helicopter-borne weapons for suppressive fires, communication equipment both for command and control and for air traffic control. To combat air mobile operations consideration might be given to improved personal anti-aircraft weapons—a weapon which could be carried by an individual and used to shoot down low-flying aircraft without warning..

B-52 operations against such targets as those presented by the siege of Khe Sanh in the northern part of South Vietnam may also have presented Soviet R&D planners with new problems in the anti-aircraft defense of the field army. The assumption has generally been that the field army would need weapons to protect it against low flying aircraft. The B-52 attacks from high altitude have been very effective. One answer of course to B-52 high altitude raids would be interceptor aircraft, however, the degree of success of these operations could also cause investigation of an anti-aircraft weapon solution.

Illumination of the battlefield at night by means of US aircraft equipped with searchlights has also been tried with some success in Vietnam. The Soviets might consider emulation and conversely be concerned with combating that method of battlefield illumination.

The China Border Case

The China border, unlike Vietnam, has become an increasingly important basis of their Eurasian requirements for R&D in ground weaponry. Since 1962 the Soviets have been forced to build up their garrisons along the close to 5,000-mile border with China. The requirement for this buildup has resulted from Chinese attempts in various border areas to violate the frontier either on a temporary or a permanent basis.

The Soviet buildup has also been motivated by various Chinese claims to certain areas lost via nineteenth century treaties. The limitations on manpower constrain in part the R&D requirements posed by China border problems. The Soviets now have around 30 divisions in these border garrisons which have become a serious military and economic

burden. The costs of transporting the men and equipment to distant garrisons, the high costs of constructing the facilities, and the hardships of Siberian service are increasingly onerous and may become more constraining in the future.

The Soviet garrisons are equipped out of inventories with the equipment available to them at the time the decisions were made to create and increase the Far Eastern garrisons. As the necessity to patrol the China border appears to stretch into an indefinite future and as lessons and ideas from Vietnam sift back to Soviet R&D planners, a technological solution freeing manpower from the border areas might be sought.

Europe

As outlined in the discussion above, major Soviet concerns in the 1945-1960 period were with the problems of meeting the United States strategic threat and equipping their theater forces in Central Europe and the Western USSR. The resultant forces and equipment appeared to lend credence to a Soviet doctrine which, in event of war, visualized the massed movement into Western Europe of armor-protected troops and firepower equipped to exploit nuclear strikes delivered by aircraft and missiles. The specter of this movement caused some Europeans to consider their common defense, while others appear to view the threat with resignation. The US attempt to renew the common purpose in the early 1960s by suggesting a doctrine of flexible response evoked a similar ambiguous commitment from Europeans that has never been fully met. Through this period the Soviet dispositions have remained unchanged except for the stationing of forces in Czechoslovakia while the postwar generation of weapons has been replaced by newer improved versions.

In this situation the pressure within the United States to reduce our presence in Europe continues to grow. From the US point of view a reduction in US forces in Europe might cause the US to increase its intelligence surveillance and target acquisition in West Germany and other peripheral areas which in turn could lead to Soviet electronic countermeasures. The Soviets would also become, if possible, even more sensitive to technological developments in West Germany, especially if the Federal Republic increased its forces to fill gaps left by the

departure of US troop units. If such were the case, the Soviet R&D planners would undoubtedly react to the development.

Third Country Developments

Soviet R&D planners are naturally also concerned with R&D developments in third countries either as indications of improvements in the state of the art in a particular technology or as potential threats which must be countered. Soviet concern with German R&D developments has been mentioned above. Independent German efforts in any of the 14 R&D hardware efforts would no doubt stimulate Soviet R&D planners. A German decision to proceed independently with the production of MBT-70 would almost certainly invoke a Soviet R&D response if it has not done so already. Chinese developments are also closely watched and there are indications the Chinese nuclear progress may be partly responsible for the Soviet ABM effort. Chinese developments in aircraft and tanks could also cause Soviet R&D reactions.

Internal Policy Change

The above noted dynamic factors focusing on the Eurasian requirement provide a basis for Soviet R&D decisions. There are also constraints.

Internal economic problems—particularly demands for modernization of civilian industry and agriculture, housing, and consumer goods—could cause Soviet planners to seek technological solutions to military problems which have hitherto been sought with masses of troops. For instance, a more mobile force in East Germany could provide the basis for significant overall force reductions. Electronic surveillance of Soviet borders, both East and West, might lead to the same result. Air mobility in the Far East might allow the withdrawal of several divisions now established in remote garrisons.

THE IMPACT OF A US-SOVIET AGREEMENT TO LIMIT STRATEGIC ARMS

The domestic policy constraints on Soviet weapons developments may be supplemented by foreign policy considerations and lead to an agreement with the US limiting strategic weapons production and R&D.

To date, only the outlines are visible as to the scope of the Soviet agreement on strategic arms limitation. From press accounts

it appears that as a minimum the US and the Soviet Union will agree to limit the deployment of strategic armaments at a level of rough parity between the two countries. One possible result of this apparent parity between the two countries could be that the strategic weapons on each side would cancel each other out thus increasing the importance of conventional weaponry. This weaponry would be held in the inventories of the two powers for use in a limited conflict between them, say in Western Europe or in wars fought by proxies such as the Arab-Israeli conflict, the Vietnam war, and the possible reopening of the Korean front.

Strategic weapons in conditions of parity would be used only in the last resort in circumstances of extreme threat to the security of the state. How this threat is perceived at a given time is difficult to predict but it would appear to be a prudent US policy not to tempt an aggressive opponent to try to determine the limits of US restraint. Some of the savings from the reductions in the costs of strategic deployments will undoubtedly be applied, as advertised, to the social welfare and consumer sectors of the respective national economies. For the Soviets, however, there exists on the Sino-Soviet border a continuing threat which will force them willy-nilly to continue the development and deployment of conventional weapons. As noted above, the conditions existing along the China border and in a potential North China theater of operations will of themselves impart certain peculiarities to this development. The conditions, however, are not so different that weapons and equipment developed for this theater cannot be usefully employed in other theaters. Rather the peculiarities of the border situation will express themselves in certain emphases in weapons development. The Soviets will at the same time continue to maintain major strategic interests in Central Europe which will constrain them from making a simple exchange of forces from West to East. As noted above, they may seek a technological solution to the manpower and logistical dilemma of garrisoning the China border and East Europe simultaneously.

There is therefore a marked difference to our security deriving from alternative Soviet use of resources potentially diverted from strategic systems development or the civilian economy. If Soviet R&D

leads to weapons improvement for the Chinese border these weapons could be used elsewhere. If, however, resources are diverted to civilian needs they represent no military threat.

A SOVIET R&D PRIORITY MATRIX

A rough ordering of Soviet R&D priorities for the next 5-15 years might be arrived at by arranging the illustrative cases given above into a matrix as illustrated in Table 4-1.* Assuming that the various factors touched upon in preceding paragraphs had been produced by a rigorous analysis, the Soviets might be expected to give priority to the hardware areas of air mobility, intelligence surveillance and target acquisition, electronic warfare and ballistic missile defense. For the US planner, these groups would be highlighted as areas in which severe Soviet technological challenge might be anticipated and estimates of utility from US programs should be appropriately degraded. These groups plus those groups in which net assessment indicates a Soviet advantage or disadvantage would provide the R&D planner with a broad basis for ordering the US R&D effort.

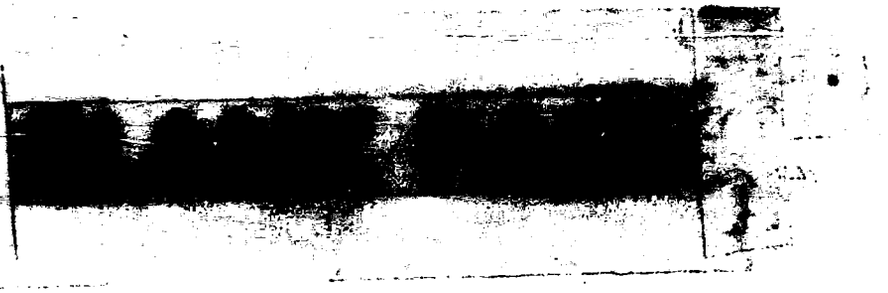
If the hypothetical information which has been arranged in Table 4-1 is reasonably reliable and given a rigorous analysis, the table might provide a rough ordering of Soviet R&D priorities for the next 5-15 years. Thus the Soviets could be expected to devote considerable effort in the areas of air mobility, intelligence surveillance and target acquisition, electronic warfare, and ballistic missile defense. To these groups the planner would also have to consider adding those groups in which the net assessments of current hardware shows the Soviets to be at a disadvantage on the premise that the Soviets will seek to neutralize or reverse their disadvantage. Finally the list will be modified to take into account judgments about those hardware areas in which hard intelligence shows the Soviets to be currently engaged in extensive efforts. Moreover, it could be used to test partial information available over time and suggest priorities for collection.

*A detailed rationale for the priorities indicated in the matrix is not provided since it is intended for illustrative purposes only. A detailed examination of each of the cases presented is obviously beyond the scope of a preliminary study. To be valid each case should be examined from the point of view of current Soviet deployments, recent intelligence, and current economic and political trends.

Table 4-1

HOW VARIANTS MIGHT AFFECT HARDWARE GROUPS

	China border	Vietnam	US force reductions in Europe	Third country developments	Internal policy change
Air mobility	X	X	X		X
Air defense		X		X	
Tank/antitank				X	
Communications	X				
Intel. surv. & target acq.	X	X	X		X
Surface mobility	X	X			
Ind. fire weapons					
Infantry weapon systems					
Logistic support	X				
Electronic war		X	X		X
Command & control	X	X			
Chemical biological		X			
Nuclear					
Ballistic missile defense	X		X	X	



Chapter 5

PROCESSING THE INTELLIGENCE INPUT

At this time it would appear especially desirable, indeed urgent, to undertake an across-the-board comparison of Soviet and US weapons and equipment to arrive at a net assessment in each area and to place each Soviet weapon and system into its operational context considering the potential missions of our forces and those of the Soviet forces. The comparison should also consider relative R&D costs and capabilities. In considering the task facing the R&D planner this paper has focused on one element of the information which he must have to make decisions—the available intelligence on the technological characteristics of the hardware produced by the United States' principal adversary and the estimation of that adversary's future course in the research and development of ground weapons and equipment.

Obviously, there will be other factors which the R&D planner must consider, not the least of which are budgetary limitations, future US strategy, force structures and commitments to equip and supply allies. (See other volumes of this report.) But, regardless of these factors, it would appear that the minimum intelligence that the R&D planner should be provided would be that which has been outlined in the previous sections. The flow of this intelligence would be as indicated schematically on Fig. 5-1. Based on our preliminary analysis the information for the ASCODs might be furnished within the Army by AMC/FSTC and ACSI/ITAD. To the comparative data found in the ASCODs would be added the answers to a series of searching questions to be formulated principally by OCRD. This information might be evaluated by a "net assessment committee." The OCRD based "net assessment committee" might produce three

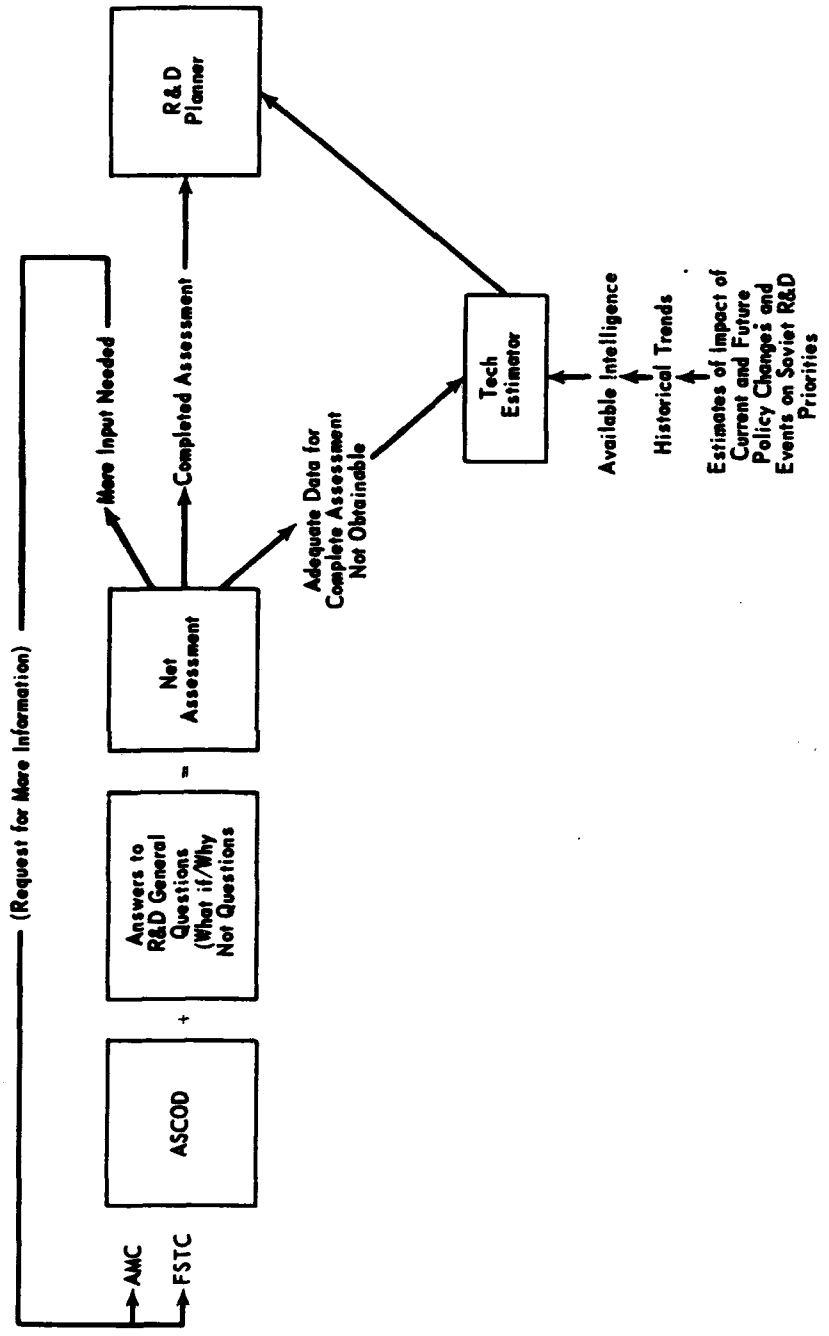


Fig. 5-1—Concept of Intelligence Flow to R&D Planner

types of results: (1) a partly-completed assessment plus a request to AMC/FSTC and ACSI/ITAD for more information; (2) a completed assessment; or (3) a decision that adequate data are not obtainable. The actions required in cases 1 and 2 are indicated on Fig. 5-1. For case 3—when adequate data are not obtainable—the technical estimator of FSTC might be tasked to provide the R&D planner with an estimate based on the available intelligence, historical trends and estimates of the impact of current and probable future policy changes on Soviet R&D priorities.

Chapter 6

CONCLUSIONS AND RECOMMENDATIONS

In an environment of US force and budget reductions, a possible US-Soviet agreement on the limitation of strategic weapons, and possible changes in Soviet R&D priorities, it is increasingly important that the US R&D planner be provided with considered current and future net assessments on a systematic basis. To accomplish this there appears to be a need for an across-the-board survey of available data in a format useful to the R&D consumer. In addition to an agreed format for the data furnished, the user should also participate in the comparative effort to the extent that answers to questions crucial, from his point of view, to the net assessment are provided. For forecasts of Soviet R&D activity over the longer term the R&D planner should require that those portions of the estimates based on linearity be clearly identified and separated from those portions based on hard intelligence estimates and that the estimator provide a rationale for his estimate as well as likely alternative courses of development. The R&D planner should also be provided with a survey of the possible influence of the dynamic economic and political factors influencing future Soviet R&D developments.

The difficulties of providing these studies preclude definite answers, particularly in the area of intelligence on future Soviet R&D efforts. On the other hand, it is also clear that the considerable data already collected is not being fully utilized. From the R&D planner's point of view it appears that an effort should be made, at least on a pilot basis, to provide him with the information he needs to make logical decisions. For him the potential benefits would include:

1. Specific identification of such advantages or disadvantages the Soviets might enjoy in each hardware area;

2. Identification of gaps in US intelligence coverage;

3. Reduction of the possibilities for technological surprise;

4. Highlighting of specific areas in which major Soviet R&D efforts can be expected.

5. Provision of a rationale to defend R&D decisions in terms of perceived threats in the ground force weapon area.

We would suggest that AMC/FSTC be tasked to provide the basic data input for the ASCODs and that AMC/FSTC and ACSI/ITAD provide the basic data for long range forecasts. Since we are suggesting a more expanded type of ASCOD input, a pilot study will be useful to illustrate completely what we have in mind. The preparation of the general questions, the "what if?," "why not?" questions to accompany the ASCODs, might best be accomplished by OCRD with outside assistance. The net assessment on a pilot basis might also be given to an ad hoc study group to see whether such assessments are feasible as a standard procedure.

In the final analysis the rationale for this systematic approach to net assessments in any R&D planning is that a process already implicit in the OCRD decision making process would be made explicit, a potentially significant improvement. As the importance of accurate assessments of the utility of alternative R&D programs may turn increasingly on the net assessment, considerable benefit may accrue not only to the US Army but ensure the security of our nation.

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AMC-CTS-05: Ammunition Jul 69
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AMC-CTS-10:
AMC-CTS-11:
AMC-CTS-12:
AMC-CTS-13:
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AMC-CTS-16:
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Section I, CURRENT INTELLIGENCE, will contain reported information covering these major categories: (1) Conventional Weapons; (2) Atomic, Biological, and Chemical; (3) Mobility and Support; (4) Communications

and Electronics; (5) Basic Sciences; and (6) Missiles. Section II, NEWS ITEMS, will contain fragmentary information. Section III, ABSTRACTS, will contain substantive abstracts of studies to be published and/or short preliminary reports concerning studies in progress. Section IV, BRIEFINGS, covers those briefings presented by FSTC staff. Section V, PUBLICATIONS DISSEMINATED, will contain a list of FSTC studies, exploitation reports, and translations that have been disseminated. Section VI, MATERIEL ACQUISITIONS, will list items acquired and the US Army installations designated to hold or exploit the materiel.

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This is a detailed study of the growth of the individual East European satellite ground forces based on an examination of the amount, size, variety and modernity of individual-country ground-combat inventories. It then attempts to indicate in very general terms the individual-country capability to maintain this inventory from within its area resources.

24. Research Analysis Corporation, R-84, "State Enterprises External to the Soviet Defense Ministry Which Augment Military Capability (U)," SECRET (Group 1), Study 009.213, 172 pp., James T. Reitz. (Version cleared for open literature)

Study describes and partly quantifies the capability of 14 basically service-oriented Soviet state organizations in the areas where they augment the military potential of the regular armed forces of the Soviet Ministry of Defense. Facets of the organization, mission, strength, areas of concentration, and WWII roles of these elements as well as present cooperation with Ministry of Defense Forces, are described (in some cases tabularly) for areas affecting military capability, and future prospects are discussed.

25. Research Analysis Corporation, R-90, "Long Range Environmental Study of the Northern Tier of Eastern Europe 1990-2000 (U)," Feb 70, SECRET (Group 4), Study 009.128, 143 pp., Richard F. Staar, Heinz C. Krause, John P. Hardt, Barbara Pace and John R. Thomas.

This study identifies major conflict and nonconflict factors and appraises relevant trends that are likely to influence future environments in the time frame 1990-2000 in East Germany, Poland, and the Northern Tier of Eastern Europe as a whole. Possible interaction of such factors and trends is indicated. The range of plausible alternative environments in the time frame is described, and the environment likely to obtain in this area in 1990-2000 is identified.

26. Research Analysis Corporation, R-92, "Economic Insights on Current Soviet Policy and Strategy," Dec 69, Unclassified, Study 207.101, 65 pp., John P. Hardt.

This study addresses the economic issues that underlie current and possible future Soviet national policy and assesses the leadership's decisions on the use of the nation's resources.

27. Research Analysis Corporation, R-106, "Constraints on European Security - The Soviet Factor," May 70, Unclassified, Study 009.118, 72 pp., Barbara F. Pace and John R. Thomas.

This study examines the Soviet Union's historic and current view of Europe's role in Soviet national security; the postwar Soviet attitude toward NATO, the US, and West Germany; and the postwar Soviet military strategy and posture as determinants shaping the Soviet attitude toward European security arrangements.

28. Research Analysis Corporation, T-458, "Selected Strategic Trends in The Communist World--Their Implications for Military Planning (U)," Study 62.5; Vol 1 "The Soviet Union in the Decade Adead (U)," Jul 65, SECRET (Group 1), Study 62.5, 86 pp., AD 373000; Vol II, "East Europe in Flux (U)." Jul 65, CONFIDENTIAL (Group 1), Study 62.5, 96 pp., AD 373001, John P. Hardt, Howard L. Felchlin, Stanley H. Cohn, Dimitri M. Gallik, Zora P. Pryor, Heinz C. Krause, James T. Reitz, Ralph L. Powell, Mildred C. Vreeland, Kung-Lee Wang.

Major economic, political and military trends in USSR, East Europe, and Communist China are identified with particular emphasis on those factors that may substantially influence strategic planning for the period 1965-1975.

29. Research Analysis Corporation, TP-137, "The 1959 Soviet Intersectoral Flow Table," Vol I, Nov 64, Unclassified, Study RP-121, 128 pp., AD 476849, Vladimir G. Treml; Vol. II, APP A-F, Nov 64, Unclassified, Study RP-121, 131 pp., AD 476858, Vladimir G. Treml.

This study analyzes and evaluates the 1959 Soviet 83-sector input-output table and its labor-input complement, especially the methods of construction, data collection, pricing, and sector adjustment and classification. The entire table is reconstructed by estimation of elements and entries omitted from the table published by the USSR.

30. Research Analysis Corporation, "Conflicting Patterns of Civil-Military Relations in the USSR," May 64, Unclassified, Study TP-142, 72 pp., AD 476850, Louis Nemzer.

This paper traces the historical interrelations between Soviet civilian and military institutions through 1964.

31. Research Analysis Corporation, TP-152, "A Comparative Study of US-USSR Weapons and Equipment (U)," Vol. I, "Selected Ground-Combat Weapons Including Tactical Aircraft (U)," Nov 65, SECRET (Group 1), Study IR-237, 147 pp., AD 367995, Ruth Beatrice Dane, Louis Senunas, Dean T. Vanderhoef; Vol. II, "Selected Military Support Equipment (U)," Oct 65, SECRET (Group 1), Study IR-237, 55 pp., AD 367996, Ruth Beatrice Dane, Dean T. Vanderhoef.

This study provides information on US and USSR military equipment on a weapon by weapon basis. The history of each class of weapons is traced with projections for the five year outlook, 1965-70.

32. Research Analysis Corporation, TP-318, "Major Determinants of Soviet Force Structure: An Analytical Framework (UO," Jul 68, CONFIDENTIAL (Group 4), Study 007.127, 43 pp., AD 392703, Ruth Beatrice Dane, Dean T. Vanderhoef.

The analysis examines the major factors determining Soviet force structures and attempts to delineate alternative courses of action open to the Soviet decision makers together with the difficult choices that go with each.

33. Research Analysis Corporation, TP-362, "Consolidated 1963 Soviet Input-Output Table (U)," Unclassified, Study 238.201, V. G. Treml, D. Gallik, B. Kostinsky.

The study develops input-output tables which provide a system of data that brings out the interrelationships and interdependence among major sectors of the Soviet economy as it existed in 1963. The system is comprehensive, covering the entire economy, and it is balanced in that all output is accounted for.

34. DIA, "Register of Intelligence Publications (U), SECRET, Dec 68.

This is a listing of selected intelligence studies held by the DIA Library. A complete listing is found in the STIR document.

II. TECHNOLOGICAL FORECASTS

1. DA, ACSI, "Army Analysis of Intelligence (U);" Vol. 1: Long Range (1980-1989) SECRET, Dec 69, STS-0-1446.

The primary orientation of this volume is toward satisfying the need of the Army strategic planners for intelligence information about the worldwide land-combat environment in the long-range period (1980-89).

2. DIA, "Long Range Scientific & Technical Intelligence Assessment (LRTIA) of the USSR (U)," SECRET, 1 Dec 69, ST-CS-17-1-69.

The purpose of this document is to forecast Soviet technical military capability resulting from scientific and technological accomplishments throughout the fifteen-year period from 1969 to 1984. It is intended principally for use by military planners in the development of threat projections over the mid- and long-range.

3. DA, ACSI, Vol. 1, "USSR Forecast of Conflict Environment, 1985-1995 (U)," SECRET, Dec 68.

The socio-political-economic dimensions of the Soviet Union in the 1985-95 time frame are analyzed in a three part study. The Soviet system is addressed in terms of groups that will be influential in the future, how they are likely to compete for power, and goals they are likely to seek for the Soviet Union. The means available to future leaderships with which to seek national goals are surveyed. Several alternative environments for the forecast time frame are postulated and described in terms of leadership, nature of the political system, economic priorities, foreign policies and social cohesion.

4. DA, ACSI, "Data Handbook, Projected Soviet Ground Forces - 1976 (U)," SECRET, Oct 67.

The purpose of this document is to provide an approved data base for Army common use in assessing the capability of Soviet ground force units to conduct non-nuclear Warfare during the period out to 1976. It is intended to serve as a basic point of reference for threat analysis required in Army developmental studies in which proposed US weapons systems or forces are evaluated against the estimated capabilities of a specific Soviet ground force threat.

5. DIA, "Defense Intelligence Projections for Threat Analysis (DIPTA);" (USSR) Vol. II, TOP SECRET, 1970.

This is currently a draft under review. The ground force section was not available as of August 1970.

6. USA-AMC-FSTC, "The Soviet Technological Threat to the US Ground Forces (1969-1980) (U)," SECRET, Jun 69, ST-S-9-6408.

The purpose of this study is to present the most pertinent factors relating to the Soviet technological threat to US ground forces; to analyze strengths and weaknesses as they affect the Soviet military posture; to briefly discuss the organization, research and development capabilities, production facilities, and other factors relating to Soviet structuring of its economy for military purposes; and to forecast expected ground force developments for the period 1969-1980. The planned revision is annual in the form of a study.

7. DA Missile Command, "Target Arrays for a Soviet Front, 1969-1975 (U)," SECRET, Dec 65, Mid-CR-17-05-65.

This study is an attempt to bridge the gap between strict order of battle information and Soviet military doctrine.

8. DA Missile Command, "Soviet Threat to the Chaparral Missile System 1966-75 (U)," SECRET, 1966, MID-CR-17-06-66.

This is one of a series of Missile Intelligence Directorate threat studies pertaining to US Air Defense Missile Systems. Already completed are "The Soviet Threat Relating to SAM-D Weapon System, 1970-80" and "The Soviet Threat to REDEYE Missile System (Tactical Aviation) 1966-75." Completion of threats to HAWK and HERCULES is expected shortly. Will be updated as intelligence considerations and requirements dictate.

9. DA Missile Command, "Soviet Threat to the U.S. Antiarmor Missile System, SHILLELAGH, TOW and MAW (1966-75) (U)," Dec 66, MID-CR-17-05-66.
This is one in a series of MID threat studies pertaining to US Land Combat Systems. Already completed are "The Soviet Threat to the PERSHING Missile System, 1965-75" and "The Soviet Threat to the LANCE Missile System, 1966-75." Completion of "The Threat to the SERGEANT Missile System" is expected shortly. This document has been prepared to present a discussion of those items, with the exception of environmental factors such as climate and terrain, which are considered to pose the basic Soviet threat to the anti-armor missile systems, SHILLELAGH, TOW and MAW.

10. Research Analysis Corporation, TP-142, "Conflicting Patterns of Civil-Military Relations in the USSR," May 64, Unclassified, Study RP-121, 72 pp, AD 476850, Louis Nemzer.
This paper traces the historical interrelations between Soviet civilian and military institutions through 1964.

11. Research Analysis Corporation, TP-172, "Limited Nuclear War in Soviet Strategic Thinking," Nov 65, Unclassified, Study 62.5, 35 pp, AD 474546, John R. Thomas.
The purpose of this study is to examine the broader political and strategic considerations that currently influence Soviet thinking about the feasibility of limited nuclear war, particularly in West Europe.

12. Research Analysis Corporation, TP-270, "The Soviet Union and the Vietnamese Conflict: Some Factors Affecting the Soviet Attitude," Sep 67, Unclassified, Study 007.127, 21 pp, AD 820050L, John R. Thomas.
The paper describes an ideal solution to the Vietnamese conflict from the Soviet viewpoint. It also places Vietnam in the perspective of other Soviet objectives and priorities. It notes the obstacles to Soviet attainment of an ideal solution and describes the factors that may produce a drastic change in the Soviet Union's assessment of the importance of Vietnam to its calculations.